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SUMMARY AND CONCLUSIONS OF CALIFORNIA TOLL-BRIDGE REPORT

THE FOLLOWING IS QUOTED VERBATIM FROM A REPORT BY THE CALIFORNIA HIGHWAY COMMISSION, DATED JANUARY, 1929, AND ENTITLED "INVESTIGATION AND REPORT ON TOLL BRIDGES IN THE STATE OF CALIFORNIA". COPIES OF THE REPORT MAY BE OBTAINED FROM THE CALIFORNIA STATE PRINTING OFFICE AT SACRAMENTO.

SUMMARY AND CONCLUSIONS

SUMMARY AND CONCLUSIONS AS FOLLOWS ARE DRAWN FROM AN INVESTIGATION AND STUDY OF THE TOLL BRIDGES COVERED IN THIS REPORT.

1.- PERTAINING TO MATTERS OF PROMOTION AND ORGANIZATION OF BOTH PRIVATELY AND PUBLICLY OWNED TOLL BRIDGES.

A. IT IS SHOWN THAT THE COST OF PROMOTION AND ORGANIZATION OF PRIVATELY OWNED TOLL BRIDGES IS IN MANY CASES A MAJOR ITEM IN THE COST. SUCH AN EXPENSE DOES NOT AMOUNT TO ANY CONSIDERABLE SUM IN THE COST OF A PUBLICLY OWNED AND CONSTRUCTED BRIDGE. FOR THIS PURPOSE $1,166,776 WAS SPENT ON THE CARQUINEZ AND ANTIOCH BRIDGES. THE ESTIMATED ORGANIZATION COST CONNECTED WITH BUILDING THESE BRIDGES UNDER STATE SUPERVISION, PUBLICLY FINANCED, IS $153,500.

THE COST OF PROMOTION AND ORGANIZATION FOR THE SAN MATEO-HAYWARD BRIDGE IS DIFFICULT TO SEGREGATE. AN ITEM OF $154,060 IS GIVEN IN THEIR ORIGINAL COST ESTIMATE FOR ORGANIZATION, LEGAL AND CORPORATION EXPENSES. IT IS NOTED UNDER CONSTRUCTION DATA THAT 5567 SHARES OF PREFERRED STOCK AND 22,268 SHARES OF COMMON STOCK WERE GIVEN THE RAYMOND CONCRETE PILE COMPANY FOR PROMOTION AND ORGANIZATION. THE PREFERRED STOCK IS VALUED AT $55,670, AND THE COMMON STOCK HAS BEEN SHOWN TO HAVE AN ESTIMATED VALUE OF FROM $33 TO $79.50 PER SHARE DEPENDING ON THE INTEREST RATE AND FUTURE TRAFFIC.

THESE FIGURES INDICATE AT LEAST $55,670 PLUS $730,000, OR $785,670, MAY BE CHARGED TO PROMOTION AND ORGANIZATION. IT IS ESTIMATED THAT A SIMILAR CHARGE UNDER STATE CONSTRUCTION WOULD NOT EXCEED $160,000.

B. THE CONCLUSION IS DRAWN THAT PRIVATE INTERESTS ARE INCLINED TO RECOGNIZE THE NECESSITY OF BRIDGES AT STRATEGIC POINTS MORE READILY THAN ARE PUBLIC OFFICIALS. LIKEWISE, PRIVATE

INTERESTS AND PROMOTERS OFTEN BUILD OR ATTEMPT TO BUILD TOLL BRIDGES AT LOCATIONS WHERE THE TRAFFIC DOES NOT JUSTIFY THEM. ANTICIPATED PROFITS FROM ONE OR MORE OF THE FOLLOWING SOURCES ARE THE INSPIRATION FOR TOLL BRIDGE PROMOTION, NAMELY: PROMOTION FEES, BRIDGE CONTRACTS AND PROFITS FROM TOLLS BASED ON EXPECTED FUTURE TRAFFIC.

C. THE CONCLUSION IS DRAWN THAT IN THE CASE OF THE CARQUINEZ BRIDGE, PUBLIC OFFICIALS FAILED TO RECOGNIZE THE NECESSITY OF BUILDING A PUBLICLY OWNED STRUCTURE.

D. IT IS ALSO EVIDENT FROM THE ESTIMATED TOLLS WHICH COULD HAVE BEEN CHARGED, HAD THE STATE FINANCED THE SAN MATEO-HAYWARD BRIDGE, THAT THE COST OF SERVICE OVER THE REMAINING 47-YEAR LIFE PERIOD OF THE FRANCHISE WOULD, ON A PUBLICLY OWNED BRIDGE AT THIS LOCATION, BE ONLY ABOUT 35 PER CENT OF THAT WHICH WILL BE CHARGED BY THE PRIVATELY OWNED TOLL BRIDGE, PROVIDED THE NOW AUTHORIZED RATES OF TOLLS ARE MAINTAINED UNTIL SUCH TIME AS THE 15 PER CENT EARNING AS LIMITED BY LAW COMPELS THEIR REDUCTION.

2.- PERTAINING TO MATTERS OF FINANCING.

A. THE COST OF FINANCING PRIVATELY OWNED TOLL BRIDGES IS HIGHER THAN THE COST OF FINANCING PUBLICLY OWNED TOLL BRIDGES. IT IS SHOWN THAT THE COST OF FINANCING THE CARQUINEZ AND ANTIOCH BRIDGES INCLUDES AN ITEM OF 500,000 SHARES STOCK BONUS AND AN ITEM OF $673,853 FOR BOND DISCOUNT. COMPUTING THE STOCK AT PAR VALUE $1 PER SHARE, GIVES A SUM OF $1,173,853 DISCOUNT ON A $6,500,000 BOND ISSUE. $4,500,000 OF THESE BONDS BEAR 7 PER CENT INTEREST AND $2,000,000 BEAR 8 PER CENT INTEREST.

BONDS ISSUED BY THE STATE OF CALIFORNIA GUARANTEED BY THE CREDIT OF THE STATE AND BEARING 4½ PER CENT, CAN BE SOLD BY THE STATE AT PAR.

INCOME BONDS BEARING 6 PER CENT INTEREST ISSUED BY THE STATE BUT HAVING ONLY THE INCOME FROM TOLLS AS THE SOLE SECURITY, CAN BE SOLD AT PAR.

B. FINANCING A PRIVATELY OWNED TOLL BRIDGE BY SALE OF STOCK IS USUALLY DIFFICULT AND IS EXTENDED OVER A COMPARATIVELY LONG PERIOD OF TIME. AS A RESULT A CONSIDERABLE PART OF THE FRANCHISE LIFE IS CONSUMED BEFORE CONSTRUCTION CAN BE FINANCED. THE RESULT IS THAT INCOME BEARING TIME IS LOST AND THE COST OF SERVICE TO THE PUBLIC RAISED.

THE COST OF SELLING STOCK IS HIGH. THE USUAL COMMISSION FOR SELLING THIS CLASS OF STOCK IS 20 PER CENT.

C. THE CONCLUSION IS DRAWN THAT NO CORPORATION IS MORE ABLE TO FINANCE NECESSARY BRIDGES CONNECTING WITH THE STATE HIGHWAY SYSTEM THAN THE STATE OF CALIFORNIA. NOR CAN ANY PRIVATE CORPORATION FINANCE BRIDGES AS CHEAPLY AS CAN THE STATE.

D. THE STATE CAN MOST ECONOMICALLY FINANCE TOLL BRIDGES BY ISSUING BONDS WHICH ARE RECOGNIZED AS A DIRECT OBLIGATION ON THE STATE, BUT WHICH ARE TO BE RETIRED BY INCOME FROM TOLLS. SUCH BONDS WOULD REQUIRE A VOTE OF THE PEOPLE FOR EACH BRIDGE PROJECT.

SINCE SUCH A METHOD OF FINANCING IS NOT GENERALLY PRACTICABLE, THE BEST ALTERNATE METHOD OF FINANCING IS TO ISSUE INCOME BONDS WHICH HAVE AS THEIR SOLE SECURITY THE INCOME FROM TOLLS. THE STATE CAN SELL SUCH BONDS AT A MUCH LOWER RATE OF INTEREST THAN CAN A PRIVATE COMPANY, PRIMARILY BECAUSE THEY ARE A SAFER INVESTMENT. A PRIVATE CORPORATION HAS A CERTAIN TIME, LIMITED BY THE FRANCHISE, IN WHICH TO RETIRE THEIR BONDS AND AMORTIZE THE COST OF THE BRIDGE. THE INVESTOR IS REQUIRED TO GAMBLE THAT SUFFICIENT INCOME WILL BE OBTAINED IN THAT LIMITED PERIOD OF TIME TO PAY INTEREST AND RETIRE THE BONDS. AS A RESULT HE DEMANDS A HIGH RATE OF INTEREST AND A SUBSTANTIAL BOND DISCOUNT.

THE STATE IN SELLING INCOME BONDS WILL FIX A DATE AT WHICH THE BONDS ARE DUE, BUT IF THE INCOME IS NOT SUFFICIENT DURING THAT TIME TO PAY BOND AMORTIZATION AND INTEREST THEY CAN REFINANCE THE UNPAID BONDS AND CONTINUE TO COLLECT TOLLS UNTIL THE BONDS ARE PAID BECAUSE THEY STILL OWN THE BRIDGE. THIS THE PRIVATE COMPANY CANNOT DO BECAUSE THEY MUST SURRENDER THE RIGHT TO COLLECT TOLLS AT THE EXPIRATION OF THE FRANCHISE. THIS IS THE MAJOR REASON WHY INVESTORS DEMAND A HIGHER RETURN ON THE BONDS OF PRIVATELY OWNED BRIDGES THAN THEY DO ON THE BONDS OF ONES PUBLICLY OWNED.

REFERRING TO SECTION V, PARAGRAPH 4B, P. 50, OF THIS REPORT, IT IS SHOWN THAT THE ANNUAL COST OF BOND FINANCING, INCLUDING BOND DISCOUNT, STOCK BONUS AND INTEREST IS 8.7 PER CENT PLUS FOR THE CARQUINEZ AND ANTIOCH BRIDGES. THE STATE CAN SELL INCOME BONDS AT AN INTEREST RATE OF 6 PER CENT OR LESS.

REFERRING TO SECTION V, PARAGRAPH 4B, P. 85, SAN MATEO-HAYWARD BRIDGE, IT IS SHOWN THAT THE INTEREST RATE ON BOND FINANCING INCLUDING ALL CHARGES IS 7.7 PER CENT AND TO THE SAME SECTION,

P. 95, FOR THE DUMBARTON BRIDGE, THAT THE INTEREST RATE ON BONDS INCLUDING ALL CHARGES IS 7.3 PER CENT.

3.- MATTERS PERTAINING TO INCOME TO INVESTORS IN PRIVATELY OWNED TOLL BRIDGES.

A. IT IS SHOWN THAT INVESTORS IN THE STOCKS OF PRIVATELY OWNED TOLL BRIDGES IN THE STATE OF CALIFORNIA, IN SOME CASES MAY EXPECT A FAIR RETURN ON THEIR INVESTMENT, IN OTHERS A LARGE RETURN, AND IN OTHERS A LOW RETURN. THE STOCK RETURN DEPENDS ENTIRELY UPON THE TRAFFIC REALIZED. THE PREDICTED TRAFFIC CHARTS AND FIGURES SHOWN IN THIS REPORT ARE CONSIDERED TO BE CONSERVATIVE AND AN INCREASE OR DECREASE IS ENTIRELY POSSIBLE.

NO ATTEMPT HAS BEEN MADE TO ESTIMATE THE EFFECT OF FUTURE COMPETITIVE ROUTES IN ESTIMATING THE TRAFFIC.

AN AVERAGE RETURN ON THE PAR VALUE OF THE STOCK BASED ON THE PREDICTED TRAFFIC FOR THE CARQUINEZ AND ANTIOCH BRIDGES IS INDICATED AT AN APPROXIMATE AVERAGE OF 6 PER CENT. AN INCREASE OR DECREASE IN THE RATE OF GROWTH OF TRAFFIC WILL INCREASE OR DECREASE THE RATE OF RETURN TO THE STOCKHOLDER.

IT HAS BEEN SHOWN THAT THE ACTUAL RATE PAID ON MONEY OBTAINED THROUGH THE ISSUE OF BONDS IS 8.7 PER CENT ON THE AMERICAN TOLL BRIDGE COMPANY PROJECTS. AN INCREASE IN TRAFFIC WILL SLIGHTLY INCREASE THIS RETURN BECAUSE OF THE STOCK BONUS GIVEN THE BONDING COMPANY. THIS RATE OF RETURN ON BONDS IS CONSIDERED TO BE EXCESSIVE.

THE REPORT SHOWS THAT, EXCEPT FOR THE POSSIBILITY THAT A FREE BRIDGE MIGHT HAVE BEEN CONSTRUCTED NEAR ANTIOCH, WHICH WOULD HAVE DETRACTED FROM THE BUSINESS OF THE CARQUINEZ, THE AMERICAN TOLL BRIDGE COMPANY WOULD HAVE BEEN BETTER OFF AS FAR AS STOCK DIVIDENDS ARE CONCERNED IF THEY HAD NOT BUILT THE ANTIOCH BRIDGE.

B. IN THE CASE OF THE SAN MATEO-HAYWARD BRIDGE, IT HAS BEEN SHOWN THAT THE FIRST MORTGAGE BONDS WILL RETURN $6\frac{1}{3}$ PER CENT, AND THAT THE SECOND MORTGAGE BONDS WILL RETURN 10 PER CENT ON THE LOWEST PREDICTED TRAFFIC ESTIMATE.

IT HAS BEEN SHOWN THAT AS FAR AS WE ARE ABLE TO ASCERTAIN, NO ACTUAL MONEY HAS BEEN PAID FOR ANY OF THE COMMON STOCK. 120,000 SHARES HAVE BEEN ISSUED AND ARE HELD ENTIRELY BY THOSE

DIRECTLY INTERESTED IN THE BRIDGE. IT HAS BEEN SHOWN THAT ON THE LOWEST TRAFFIC ESTIMATE THIS STOCK WILL HAVE A PRESENT WORTH OF $33 PER SHARE WITH A REASONABLE POSSIBILITY THAT IT WILL BE WORTH AS MUCH AS $79.50 PER SHARE. THIS WORTH WILL BE ACQUIRED BY THE COMMON STOCK HOLDERS WITHOUT CAPITAL INVESTMENT (OTHER THAN SERVICES PRIOR TO THE OPENING OF THE BRIDGE).

4.- MATTERS PERTAINING TO THE TRAVELING PUBLIC.

A. THE TRAVELING PUBLIC HAS RECEIVED THE ADDED FACILITIES OF THE ANTIOCH AND CARQUINEZ BRIDGES OVER THOSE OF A FERRY AT LEAST FIVE YEARS IN ADVANCE OF THE TIME WHEN THE STATE WOULD HAVE GIVEN THEM, DUE TO THE FACT THAT PUBLIC OFFICIALS DID NOT RECOGNIZE THE NECESSITY OF A PUBLICLY OWNED BRIDGE AT CARQUINEZ.

B. IT HAS BEEN SHOWN THAT THE CAPITAL INVESTMENT IN THE CARQUINEZ AND ANTIOCH BRIDGES IS EXCESSIVE WHEN COMPARED WITH THE ESTIMATED COST OF REPRODUCTION OF THESE BRIDGES BY THE STATE.

THE COSTS ARE AS FOLLOWS:

COST OF CONSTRUCTION OF ANTIOCH AND CARQUINEZ BRIDGES TO AMERICAN TOLL BRIDGE COMPANY	$9,520,789
ESTIMATED COST OF CONSTRUCTION TO THE STATE TO REPRODUCE THESE BRIDGES AT THE SAME LOCATION FINANCED BY INCOME BONDS AT 6 PER CENT	7,675,900

C. IT HAS BEEN SHOWN THAT THE COST OF OPERATION OF THE CARQUINEZ AND ANTIOCH BRIDGES IS EXCESSIVE WHEN COMPARED WITH THE ESTIMATED COST OF OPERATION OF SIMILAR BRIDGES, HAD THEY BEEN FINANCED AT A LOWER INTEREST RATE AND CONSTRUCTED BY THE STATE.

THE COMPARATIVE COSTS OF OPERATION ARE AS FOLLOWS:

COMBINED ANNUAL COST OF OPERATION OF ANTIOCH AND CARQUINEZ BRIDGES BY THE AMERICAN TOLL BRIDGE COMPANY	$1,176,000
COMBINED ANNUAL ESTIMATED COST OF OPERATION BY THE STATE, OF BRIDGES CONSTRUCTED AND OPERATED BY THE STATE (6 PER CENT BASIS OF FINANCING)	918,600
ANNUAL SAVING IN COST OF OPERATION	$257,400

D. It has been shown that the average toll per vehicle, until 1948 when the bridges will become free, will be $0.82 for the Carquinez Bridge and $0.84 for the Antioch Bridge as operated by the American Toll Bridge Company. While the average toll necessary to operate and pay for a bridge similar to the Carquinez Bridge if financed and built by the State on a 6 per cent income bond basis would be $0.44 per vehicle, and if financed and built by the State on a $4\frac{1}{2}$ per cent bond basis, the required toll would be $0.38 per vehicle.

It should be noted that an increase or decrease in traffic will not materially change the relative amount of tolls, as the toll rates under private or public ownership are in both cases a function of the traffic. An increase in traffic will justify the lowering of tolls in either case while a decrease in traffic will justify the raising of tolls.

For economic studies the above ratio between tolls on the privately owned bridges and the tolls on publicly owned bridges at Carquinez and Antioch, may be taken at the ratio of 83 to 44 or 38, depending on the method of financing the publicly owned bridges.

It would be difficult to lower the tolls on a privately owned bridge, even though the increase in traffic might justify such action, while on the publicly owned bridge no profits are expected and there would be no object in not lowering tolls if increased income justified such action.

The above ratio of tolls for the Carquinez and Antioch bridges indicates that for these bridges the cost of public service on the present bridges is at least 88 per cent higher than it would have been on similar bridges constructed and operated by the State.

It has been shown that the tolls permitted by law on the San Mateo-Hayward Bridge over the life of the franchise, viz., to 1977, will be as follows:

1930 to 1950	
Pleasure cars	$0.60 per vehicle
Commercial cars	1.75 per vehicle
1950 to 1957	
Pleasure cars	0.56 per vehicle
Commercial cars	1.66 per vehicle
1957 to 1977	
Pleasure cars	0.56 per vehicle
Commercial cars	1.13 per vehicle

IF THE STATE HAD FINANCED AND CONSTRUCTED THE BRIDGE AN AVERAGE TOLL OF 15 CENTS FOR PLEASURE CARS AND 58 CENTS FOR COMMERCIAL VEHICLES WOULD BE ALL THAT IS NECESSARY TO OPERATE AND AMORTIZE THE COST OF THE STRUCTURE OVER THE ACTIVE LIFE OF THE FRANCHISE.

E. THE CONCLUSION IS MADE THAT ANY BRIDGE, BE IT A PRIVATELY OR PUBLICLY OWNED TOLL BRIDGE OR A PUBLICLY OWNED BRIDGE ON WHICH NO TOLLS HAVE EVER BEEN PAID, IS A TOLL BRIDGE. THE TRAVELING PUBLIC EVENTUALLY PAYS FOR ALL OF THEM, EITHER BY TOLLS OR TAXES. A TAX MAY BE CALLED A TOLL OR A TOLL A TAX, AND THE TAXES OR TOLLS PAID CONSTITUTE THE COST OF PUBLIC SERVICE RECEIVED IN CROSSING THE BRIDGE. THE METHOD OF BUILDING AND FINANCING ANY BRIDGE WHICH RESULTS IN THE LEAST POSSIBLE COST OF PUBLIC SERVICE IS THE BEST WAY.

A GREAT MANY MILES OF HIGHWAY AND MANY BRIDGES IN THE STATE WOULD SHOW AN APPARENTLY HIGH COST OF PUBLIC SERVICE ON THE CAPITAL INVESTED IF REDUCED TO A TOLL BASIS, WHILE THE REVERSE WOULD BE TRUE IN MANY OTHER CASES. LIKEWISE SOME OF THE PRIVATELY OWNED ROADS AND BRIDGES SHOW A RELATIVELY LOW COST OF PUBLIC SERVICE, AND OTHERS SHOW A HIGH COST. IN THE CASE OF PRIVATELY OWNED BRIDGES AND ROADS, A RELATIVELY LOW COST OF SERVICE WILL ORDINARILY REPRESENT A LOSS TO THE INVESTORS, WHILE A RELATIVELY HIGH COST OF SERVICE WILL REPRESENT A PROFIT TO THE INVESTOR.

THE PUBLIC SHOULD BE SUPPLIED WITH NECESSARY ROADS AND BRIDGES, BUT THEY SHOULD NOT BE BURDENED WITH UNNECESSARY ONES.

ALL NECESSARY ROADS AND BRIDGES SHOULD BE EITHER BUILT AND OPERATED BY THE PUBLIC OR ALL BUILT AND OPERATED BY PRIVATE CAPITAL. IN EITHER CASE, THE COST OF PUBLIC SERVICE ON ALL ROADS AND BRIDGES WHICH SHOW A HIGH COST OF OPERATION SHOULD BE OFFSET BY THE LOW COST OF SERVICE OF ROADS AND BRIDGES WHICH SHOW A LOW COST OF OPERATION, IF THE PUBLIC IS TO RECEIVE THE MINIMUM NET COST OF SERVICE OVER THE ENTIRE SYSTEM.

IN THE STATE OF CALIFORNIA EITHER THE STATE OR COUNTIES AND CITIES OWN AND OPERATE MORE THAN 95 PER CENT OF THE ROADS AND BRIDGES. IT SHOULD, THEREFORE, NOT BE NECESSARY NOR SHOULD PRIVATE CAPITAL BE ALLOWED TO PICK OUT ADVANTAGEOUS POINTS ON THE HIGHWAY SYSTEMS AND BUILD TOLL ROADS OR BRIDGES WHICH WILL TAKE PROFITS THAT WOULD OTHERWISE TEND TO LOWER THE AVERAGE COST OF HIGHWAY SERVICE ON THE ENTIRE PUBLIC HIGHWAY SYSTEM. NOR SHOULD PRIVATE CAPITAL BE REQUIRED OR ALLOWED TO SELECT OTHER POINTS ON THE HIGHWAY SYSTEMS AND BUILD AND OPERATE ROADS AND BRIDGES,

WHICH WILL REPRESENT A LOSS TO PRIVATE INVESTORS EVEN THOUGH SUCH ROADS OR BRIDGES SO OPERATED MAY LOWER, OR NOT INCREASE THE NET COST OF SERVICE OVER THE ENTIRE HIGHWAY SYSTEM.

THE ECONOMIC CONSTRUCTION AND OPERATION OF THE PUBLIC HIGHWAY SYSTEM SHOULD BE FROM A STANDPOINT OF THE ENTIRE STATE, OR EVEN NATION, RATHER THAN FROM A LOCAL POINT OF VIEW AS A CITY OR COUNTY. MANY PUBLIC OFFICIALS ARE INCLINED TO FAVOR THE BUILDING OF TOLL ROADS AND BRIDGES BY PRIVATE CAPITAL, GIVING AS REASONS FOR SO DOING THAT THEY CAN NOT FINANCE SUCH ROADS AND BRIDGES, OR THAT THEY EXPECT TO MAKE MONEY OUT OF GROSS INCOME TAX OR FROM TOLLS TAKEN AFTER THE FRANCHISE EXPIRES AND THE BRIDGE BECOMES LOCAL PUBLIC PROPERTY, OR THAT NO TAXES OR LOCAL BOND ISSUES WILL BE NECESSARY IF FINANCED BY PRIVATE CAPITAL.

ANALYZING THE PROBLEM OF SERVICE COST THE FINAL CONCLUSION IS REACHED THAT THE STATE CAN FINANCE NECESSARY ROADS AND BRIDGES AT LESS COST THAN PRIVATE CORPORATIONS, THAT THE PAYING OF TOLLS IS JUST AS MUCH A TAX AS IS GAS TAX, OR TAXES LEVIED TO RETIRE NECESSARY BOND ISSUES; THAT THE PUBLIC WILL IN MOST CASES PAY MORE IN TOLLS TO THE PRIVATE CORPORATION THAN THEY WOULD IN TOLLS ON A PUBLICLY OWNED TOLL ROAD OR BRIDGE, OR IN TAXES TO RETIRE NECESSARY PUBLIC BOND ISSUES, OR IN GAS TAX.

THE ARGUMENT THAT A COUNTY OR CITY CAN MAKE MONEY FROM A TOLL BRIDGE IS FUNDAMENTALLY WRONG. THE CITIZENS OF ANY COUNTY OR CITY EVENTUALLY TRAVEL TO A GREATER OR LESSER DEGREE THE ROADS OF EVERY OTHER COUNTY OR CITY. IT IS NOT ECONOMICALLY SOUND THAT THE CITIZENS OF ONE COUNTY OR CITY SHOULD TRAVEL FREE THE ROADS OF ANY OTHER COUNTY OR CITY, OR THE STATE HIGHWAY SYSTEM, AND IN TURN EXACT A PROFIT FROM TRAVELERS OUTSIDE OF THEIR BOUNDARIES USING THEIR ROADS AND BRIDGES.

THE CITY AND COUNTY OF SAN FRANCISCO HAS RECOGNIZED THESE PRINCIPLES IN REJECTING ALL FRANCHISES APPLIED FOR BY PRIVATE INTERESTS, TO BUILD A PRIVATELY OWNED TOLL BRIDGE ACROSS SAN FRANCISCO BAY FROM SAN FRANCISCO TO OAKLAND OR ALAMEDA.

F. PERTAINING TO PRESENT AND ADDED INVESTMENTS BY THE PUBLIC IN HIGHWAY SYSTEMS.-- A CONCLUSION IS DRAWN THAT THE PRESENT ENORMOUS INVESTMENT BY THE PUBLIC IN THE STATE AND COUNTY HIGHWAYS IS BEING CAPITALIZED BY PRIVATE TOLL BRIDGE COMPANIES. ADDED INVESTMENTS BY THE PUBLIC AS IN THE AMERICAN CANYON, AND ROADS SOUTH AND NORTH OF SAN FRANCISCO, TEND TO GREATLY INCREASE THE INCOME OF TOLL BRIDGES.

5.- MATTERS PERTAINING TO EXISTING AND NECESSARY LAWS GOVERNING THE GRANTING OF FRANCHISES, CONSTRUCTION AND OPERATION OF PRIVATELY OWNED TOLL BRIDGES, THE FINANCING, PURCHASE AND OPERATION OF PRIVATELY OWNED TOLL BRIDGES BY THE STATE, AND THE FINANCING, CONSTRUCTION AND OPERATION OF STATE OWNED TOLL BRIDGES BY THE STATE.

A. A CONCLUSION IS DRAWN THAT EXISTING LAWS GOVERNING THE ISSUING OF FRANCHISES FOR TOLL BRIDGES, AS WELL AS THEIR CONSTRUCTION AND OPERATION, ARE OBSOLETE AND SHOULD BE REVISED OR AMENDED IN THE FOLLOWING RESPECTS:

(1) THE POWER OF GRANTING FRANCHISES TO PRIVATE CORPORATIONS TO BUILD TOLL BRIDGES ON THE STATE HIGHWAY SYSTEM, OR ON ANY COUNTY ROAD THAT IS, OR MAY BE, A CONNECTING LINK OF THE HIGHWAY SYSTEM, SHOULD BE VESTED IN THE HIGHWAY COMMISSION OR SUBJECT TO THEIR APPROVAL, AND THE RATES OF TOLLS FIXED BY THE RAILROAD COMMISSION.

(2) THE LAW WHICH IS NOW IN EFFECT, GIVING THE JURISDICTION OF GRANTING FRANCHISES TO THE COUNTY SITUATED ON THE LEFT BANK DESCENDING, IS DIFFICULT OF INTERPRETATION IN THE CASE OF SAN FRANCISCO BAY, AND SHOULD BE AMENDED AND CLARIFIED IF THE POWER OF GRANTING ANY FRANCHISES IS TO REMAIN WITH THE COUNTIES.

(3) POWER SHOULD BE GIVEN BY LAW TO THE HIGHWAY COMMISSION OR DIRECTOR OF PUBLIC WORKS TO LOCATE, DESIGN, CONSTRUCT AND OPERATE TOLL BRIDGES AND TO FINANCE THE LOCATION, DESIGN AND CONSTRUCTION OF SUCH BRIDGES BY ISSUING INCOME BONDS HAVING AS THEIR SOLE SECURITY THE INCOME FROM TOLLS. THE ENTIRE INCOME FROM TOLLS, AFTER DEDUCTING NECESSARY OPERATING COSTS, INTEREST, CURRENT MAINTENANCE, AND A REASONABLE SINKING FUND FOR MAINTENANCE AFTER THE TOLLS ARE REMOVED, TO BE APPLIED TO THE AMORTIZATION OF BONDS. THE BRIDGE TO BE MADE A FREE BRIDGE AS SOON AS THE BONDS ARE PAID.

(4) IF THE LEGISLATURE HAS THE POWER TO DO SO, LAWS SHOULD BE PASSED GIVING THE HIGHWAY COMMISSION OR DIRECTOR OF PUBLIC WORKS AUTHORITY TO ACQUIRE EXISTING PRIVATELY OWNED TOLL BRIDGES BY PURCHASE OR BY CONDEMNATION. STUDY OF THE SUBJECT BRINGS OUT THE FACT THAT ALL EXISTING TOLL BRIDGES HAVE BEEN FINANCED AND CONSTRUCTED UNDER FRANCHISES GRANTED BY COUNTIES UNDER THE STIPULATION THAT THE POWER TO FIX TOLLS AND THE RIGHT TO PURCHASE IS VESTED IN THE COUNTIES. WHETHER OR NOT THIS FIXING OF JURISDICTION CAN BE CHANGED IN THE CASE OF EXISTING TOLL BRIDGES IS QUESTIONABLE BECAUSE OF THE EFFECT IT MIGHT HAVE ON THE PROPERTY RIGHTS OF THE BRIDGE COMPANIES.

6.- MATTERS PERTAINING TO THE PURCHASE BY THE STATE OF EXISTING TOLL BRIDGES.

A. CARQUINEZ AND ANTIOCH BRIDGES.- IF THE STATE DESIRES TO PURCHASE BOTH OR EITHER OF THESE BRIDGES THERE ARE THREE METHODS OF COMPUTING THEIR VALUE. THESE METHODS ARE DEVELOPED IN SECTION V OF THIS REPORT, AND ARE ARRIVED AT FROM TWO POINTS OF VIEW.

FIRST - THAT OF THE STOCKHOLDER OF THE AMERICAN TOLL BRIDGE COMPANY. THERE ARE TWO VALUES FROM THE FIRST VIEWPOINT, VIZ., THE COST OF THE BRIDGES TO THE AMERICAN TOLL BRIDGE COMPANY, AND THE ESTIMATED VALUE OF THE STOCK FROM AN INVESTMENT POINT OF VIEW.

SECOND - VALUE OF THE BRIDGES FROM THE VIEWPOINT OF THE TRAVELING PUBLIC.

THE PUBLIC HAS RECEIVED AN INTANGIBLE VALUE DUE TO THE ADDED CONVENIENCE OF BRIDGES OVER FERRIES. IT IS IMPOSSIBLE TO REDUCE THIS CONVENIENCE TO DOLLARS AND CENTS BECAUSE IT IS NOT KNOWN HOW LONG IT WOULD HAVE BEEN AFTER THE PRESENT BRIDGES WERE BUILT UNTIL THE PUBLIC WOULD HAVE RECOGNIZED THE NECESSITY AND CONSTRUCTED SIMILAR BRIDGES. THIS INTANGIBLE VALUE ADDED TO THE SUM IT WOULD HAVE COST THE STATE TO BUILD THESE BRIDGES REPRESENTS THE TRUE VALUE TO THE TRAVELING PUBLIC.

REFERRING TO SECTION V, IT WILL BE SEEN THAT THE ESTIMATED VALUES COMPUTED UNDER THESE THREE HEADINGS ARE AS FOLLOWS:

(1) COST OF BRIDGE AS SHOWN ON THE BOOKS OF THE AMERICAN TOLL BRIDGE COMPANY _ _ _ _ _ _ _ _	$9,520,789
(2) VALUE OF THE CARQUINEZ BRIDGE AS AN INVESTMENT	11,214,900
(3) COMBINED VALUE OF THE CARQUINEZ AND ANTIOCH BRIDGES AS AN INVESTMENT _ _ _ _ _ _ _ _ _ _ _	11,846,400
(4) VALUE OF THE CARQUINEZ BRIDGE TO THE PUBLIC, COST OF REPRODUCTION BY STATE. NOT INCLUDING INTANGIBLE VALUE _ _ _ _ _ _ _ _ _ _ _ _ _ _ _	6,553,000
(5) COMBINED VALUE OF THE CARQUINEZ AND ANTIOCH BRIDGES TO THE PUBLIC, COST OF REPRODUCTION BY THE STATE, NOT INCLUDING INTANGIBLE VALUE	7,675,300

EITHER OF VALUES (4) OR (5) CAN NOT NOW BE REALIZED BY THE PUBLIC BECAUSE PRIVATELY OWNED BRIDGES WERE ALLOWED TO BE CONSTRUCTED RATHER THAN PUBLICLY OWNED ONES.

VALUE (1) PRESUMABLY REPRESENTS THE COST OF THE BRIDGES TO THE BRIDGE COMPANY. THE PROBLEM OF DECIDING BETWEEN THIS VALUE AND VALUE (3), OR A COMPROMISE BETWEEN THE TWO, IS EITHER A MATTER OF NEGOTIATION WITH THE BRIDGE COMPANY OR A MATTER FOR THE COURTS TO DECIDE. VALUES (2) AND (3) ARE BASED ON A PREDICTED FUTURE TRAFFIC AND A 6 PER CENT REINVESTMENT BASIS FOR MONEY RECEIVED BY THE STOCKHOLDERS FOR THE BRIDGE. IT IS NO DOUBT PRESUMPTIOUS TO PREDICT TRAFFIC AS FAR INTO THE FUTURE AS IT IS NECESSARY TO DO IN THE CASE OF ANY FRANCHISE AND THE REINVESTMENT RATE OF INTEREST IS ALSO A MATTER OF JUDGMENT.

WHETHER AN INVESTMENT IN THE CARQUINEZ BRIDGE INVOLVES SUFFICIENT RISK TO DEMAND A 6,7,8 OR 10 PER CENT INTEREST, IS PURELY A MATTER OF OPINION. IF THE STOCKHOLDERS' PRESENT INVESTMENT IN THE BRIDGE IS SAFE ENOUGH TO WARRANT ONLY A 6 PER CENT RETURN THEN HE IS ENTITLED TO A REINVESTMENT RATE OF 6 PER CENT. ON THE OTHER HAND, IF HE HAS AN 8 PER CENT RISK IN THE BRIDGE, HE IS ENTITLED TO ONLY A PRESENT WORTH BASED ON AN 8 PER CENT REINVESTMENT WHICH IS MUCH LESS THAN VALUES (2) AND (3).

COURTS HAVE, IN DETERMINING SIMILAR VALUES, TAKEN INTO ACCOUNT ALL THESE FACTORS BUT AS FAR AS IT IS POSSIBLE TO DETERMINE, NO RULE HAS BEEN LAID DOWN AND EACH CASE HAS BEEN DETERMINED INDIVIDUALLY.

A STUDY OF THESE ESTIMATED VALUES LEADS TO THE CONCLUSION THAT IT IS ALMOST IMPOSSIBLE TO FIX AN EQUITABLE PURCHASE PRICE FOR A PRIVATELY OWNED TOLL BRIDGE. IF THE LOWER VALUE IS FIXED, THE PUBLIC OBTAINS "VALUE RECEIVED" AND THE BRIDGE COMPANY REALIZES A HEAVY LOSS, WHILE ON THE OTHER HAND, IF THE HIGHER VALUE IS FIXED THE BRIDGE COMPANY OBTAINS "VALUE RECEIVED" BASED ON THE ORIGINAL CONCEPTION OF ITS INVESTMENT AND THE PUBLIC PAYS $4,190,000, OR APPROXIMATELY 60 PER CENT MORE FOR THE BRIDGES THAN IF THEY HAD CONSTRUCTED AND FINANCED THEM THEMSELVES.

REFERRING TO SECTION V, II-C, IT IS SEEN THAT THE STATE, IF GIVEN THE RIGHT BY LAW, MAY PURCHASE EITHER OR BOTH THE CARQUINEZ AND ANTIOCH BRIDGES, EVEN AT THE COST OF $11,214,900 FOR THE CARQUINEZ ALONE OR $11,846,400 FOR BOTH THE CARQUINEZ AND ANTIOCH BRIDGES, AND BY REFINANCING THEM AS OUTLINED IN SECTION V, II-C, P. 74, GREATLY REDUCE THE TOLLS NOW BEING CHARGED BY THE AMERICAN TOLL BRIDGE COMPANY. (REFER TO TABLES IN SECTION V, II-C.)

8. There are many difficulties to be surmounted and many steps to be taken before either the Carquinez or Antioch bridges, or for that matter any privately owned toll bridge, can be purchased by the State.

First - Laws must be amended or passed which will enable the State to do so.

Second - The State must decide which of the bridges or properties are to be purchased.

As has been explained, the American Toll Bridge Company has several properties among its assets, the principal ones being the Carquinez and Antioch bridges, the Martinez-Benicia ferry, the properties of the Rodeo-Vallejo ferry, and several parcels of land.

All of the values and estimates in this report pertaining to the American Toll Bridge Company are based on the assumption that only the bridge properties would be purchased, and that all other assets as ferries and real estate, except that occupied by bridges would remain as the property of the American Toll Bridge Company.

Third - If the Antioch bridge is to be acquired, it must be remembered that it is not now located on or within many miles of a State highway.

Fourth - The values given in this report are direct functions of what is a fair interest return, and of the correct prediction of future traffic.

Fifth - The present laws governing the acquisition of toll bridges gives the county granting the franchise the right to buy the bridge within five years from the filing of the certificate of completion of the bridge. If not purchased within this period, the right is then deferred until the bridge has been in existence for ten years or more.

Sixth - It will be necessary to change the law and, if possible, give the State the authority to purchase. This will probably require that the State make the present roads leading to the bridge or bridges State highways.

SEVENTH - THE PRESENT LAW PROVIDES THAT THE PURCHASE PRICE SHALL BE DETERMINED BY A BOARD OF ARBITRATION, CONSISTING OF SEVEN MEMBERS, THREE MEMBERS TO BE APPOINTED BY THE BRIDGE COMPANY, THREE BY THE PURCHASER, AND ONE BY THE JUDGE OF THE SUPERIOR COURT OF THE COUNTY.

SAN MATEO-HAYWARD BRIDGE. - IF THE STATE DESIRES TO ACQUIRE THE SAN MATEO-HAYWARD BRIDGE, IT WILL BE REQUIRED TO RECOGNIZE THE CLAUSE IN THE FRANCHISE FOR THE DUMBARTON BRIDGE REQUIRING THAT THE COUNTY CAN NOT OWN OR ACQUIRE ANY OTHER BRIDGE ACROSS THE SAN FRANCISCO BAY FROM SAN MATEO COUNTY WITHOUT FIRST BUYING THE DUMBARTON BRIDGE.

THE ESTIMATED VALUES FOR THE SAN MATEO BRIDGE ARE AS FOLLOWS:

FIRST. ON A BASIS OF COST TO THE BRIDGE COMPANY	$7,500,000
SECOND. ON A BASIS OF REPRODUCTION COST BY THE STATE.	5,946,000
THIRD. ON AN INCOME VALUE BASIS TO THE COMMON STOCK HOLDERS (BRIDGE COMPANY'S TRAFFIC PREDICTION)	
6 PER CENT BASIS OF REINVESTMENT	17,677,270
8 PER CENT BASIS OF REINVESTMENT	14,690,362

B. ON AN INCOME VALUE BASIS TO THE COMMON STOCKHOLDERS (STATE TRAFFIC PREDICTION)

6 PER CENT BASIS OF REINVESTMENT	$14,457,490
8 PER CENT BASIS OF REINVESTMENT	12,083,311

THE GREAT VARIATION IN THESE VALUES INDICATES THE EXTREME DIFFICULTY OF DETERMINING WHAT IS A FAIR VALUE FOR THIS OR FOR THAT MATTER ANY OF THE OTHER PRIVATELY OWNED TOLL BRIDGES. (READER IS REFERRED TO CORRESPONDING FIGURES FOR OTHER TOLL BRIDGES GIVEN IN THIS REPORT.)

SUMMARY OF CONCLUSIONS.

1. NONE OF THE EXISTING TOLL BRIDGES IN THE STATE OF CALIFORNIA ARE ENTIRELY ON THE STATE HIGHWAY SYSTEM.

THE CARQUINEZ BRIDGE, THE SAN MATEO-HAYWARD BRIDGE AND THE EHRENBURG BRIDGE ARE IMPORTANT CONNECTIONS OF THE HIGHWAY SYSTEM.

2. CERTAIN TOLL BRIDGES HAVE AN INTANGIBLE VALUE IN ADDITION TO THEIR PHYSICAL VALUE, DUE TO THE FACT THAT THEY HAVE GIVEN THE PUBLIC THE ADDED ADVANTAGE OF A BRIDGE OVER A FERRY SEVERAL YEARS PRIOR TO THE TIME THE PUBLIC OFFICIALS REALIZED THEIR NECESSITY AS PUBLICLY OWNED BRIDGES.

3. PRIVATELY OWNED TOLL BRIDGES COST MORE THAN PUBLICLY OWNED BRIDGES FOR THE FOLLOWING PRINCIPAL REASONS:

A. THE COST OF ORGANIZATION AND PROMOTION IS MORE FOR THE PRIVATELY OWNED BRIDGE THAN FOR THE PUBLICLY OWNED ONE.

B. THE COST OF FINANCING A PRIVATELY OWNED TOLL BRIDGE IS HIGHER THAN THE FINANCING OF A PUBLICLY OWNED BRIDGE.

C. THE COST OF CONSTRUCTION OF A PRIVATELY OWNED TOLL BRIDGE IS SOMEWHAT HIGHER (FROM 10 PER CENT TO 25 PER CENT) THAN A PUBLICLY OWNED BRIDGE, DUE IN MOST CASES TO LACK OF COMPETITION IN BIDDING ON THE CONTRACT.

D. THE COST OF OPERATION IS HIGHER ON A PRIVATELY OWNED BRIDGE THAN ON A PUBLICLY OWNED BRIDGE, PRIMARILY BECAUSE AMORTIZATION AND INTEREST CHARGES ARE MORE.

4. THE COST OF PUBLIC SERVICE OVER A PRIVATELY OWNED TOLL BRIDGE IS HIGHER THAN OVER A PUBLICLY OWNED ONE, BECAUSE THE CAPITAL INVESTMENT IS MORE AND THE INTEREST RATE HIGHER. A PROFIT IS EXPECTED ON A PRIVATELY OWNED BRIDGE AND NOT ON A PUBLICLY OWNED ONE.

5. THE FIXING OF EQUITABLE VALUES OF PRIVATELY OWNED BRIDGES IS SO INTRICATE AND INVOLVED THAT IT WOULD SEEM ALMOST IMPOSSIBLE FOR THE PUBLIC TO ACQUIRE THEM WITHOUT EITHER PAYING FROM 20 TO AS MUCH AS 250 PER CENT MORE THAN IT WOULD HAVE COST THE PUBLIC TO BUILD THEM, OR, ON THE OTHER HAND, CAUSING A HEAVY LOSS TO THE INVESTORS IN TOLL BRIDGE STOCK.

6. THE STATE OR COUNTIES OR CITIES OWN AND OPERATE MORE THAN 95 PER CENT OF THE HIGHWAY AND BRIDGES IN THE STATE. IF PUBLIC OWNERSHIP IS PROPER FOR 95 PER CENT, IT WOULD SEEM PROPER ON 100 PER CENT OF THE STATE SYSTEM.

7. ADDED INVESTMENT BY THE PUBLIC IN IMPROVING ROADS ENHANCES THE VALUE OF PRIVATELY OWNED TOLL BRIDGES LOCATED ON OR CONTIGUOUS TO THESE ROADS.

8. WITH POSSIBLY TWO EXCEPTIONS, INVESTORS IN THE PRIVATELY OWNED TOLL BRIDGES IN CALIFORNIA WILL PROBABLY REALIZE EITHER FAIR OR LARGE RETURNS ON THEIR INVESTMENT.

9. IF THE STATE DESIRES TO ACQUIRE ALL OF THE PRIVATELY OWNED TOLL BRIDGES IN CALIFORNIA WHICH ARE NOW OR WILL BE IN OPERATION DURING THE YEAR 1929, THERE WILL BE REQUIRED THE FOLLOWING APPROXIMATE CAPITAL INVESTMENT:

BASED ON THE COST OF THE BRIDGES TO THE TOLL BRIDGE COMPANIES:

CARQUINEZ AND ANTIOCH BRIDGES	$9,520,800
SAN MATEO-HAYWARD BRIDGE	7,500,000
DUMBARTON BRIDGE	2,121,000
SEARS POINT TOLL ROAD AND BRIDGES	746,000
EHRENBURG BRIDGE	268,500
	$20,156,300

BASED ON THE ESTIMATED PRESENT WORTH TO STOCKHOLDERS.

COMPUTED ON STATE TRAFFIC PREDICTION AND 6 PER CENT REINVESTMENT BASIS:

CARQUINEZ AND ANTIOCH BRIDGES	$11,846,400
SAN MATEO-HAYWARD BRIDGE	14,457,490
SEARS POINT TOLL ROAD	1,250,000
DUMBARTON BRIDGE	3,218,000
EHRENBURG BRIDGE	(NONE)

EXAMINATION OF THE REPORT SHOWS THAT THE TOTAL ESTIMATED COST OF REPRODUCTION OF ALL OF THE ABOVE BRIDGES BY THE STATE IS ABOUT $16,225,000.

10. IF THE STATE CAN ACQUIRE THE CARQUINEZ AND ANTIOCH BRIDGES EVEN AT THE PRICE OF $11,846,400 AND REFINANCE THEM AT 6 PER CENT, THE TOLLS CAN BE REDUCED FROM THE PRESENT AVERAGE TOLL OF 82 CENTS PER VEHICLE ON THE CARQUINEZ AND 84.2 CENTS PER VEHICLE ON THE ANTIOCH, TO 52 CENTS AND 61 CENTS RESPECTIVELY.

11. IF THE STATE CAN ACQUIRE THE SAN MATEO-HAYWARD BRIDGE EVEN AT THE FIGURE OF $14,457,490 AND REFINANCE IT AT 6 PER CENT, THE AVERAGE TOLLS CAN BE VERY MATERIALLY REDUCED BELOW THOSE WHICH THE BRIDGE COMPANY HAVE STIPULATED IN THE FRANCHISE.

TOLLS ARE AS FOLLOWS:

YEAR	STATE OPERATED		PRIVATELY OWNED	
	AUTO	TRUCK	AUTO	TRUCK
1930	$0.63	$1.90	$0.60	$1.75
1940	.46	1.40	.60	1.75
1950	.35	1.05	.60	1.75
1960	.29	.85	.38	1.13
1970	.24	.60	.38	1.13

12. ALL TRAFFIC PREDICTIONS IN THIS REPORT WHICH ARE A BASIS OF COMPUTING PRESENT WORTH ARE OF NECESSITY BASED UPON ESTIMATES. THE GENERAL BASIS HAS BEEN THE NATURAL INCREASE IN POPULATION EXPECTED WITHOUT CONSIDERING THE EFFECT OF FUTURE COMPETITIVE ROUTES, ETC. IT IS RECOGNIZED THAT TO PREDICT TRAFFIC 50 YEARS AHEAD IS AT BEST HAZARDOUS. IN COMPUTING PRESENT WORTH, HOWEVER, A CONSIDERABLE ERROR IN THE MORE DISTANT YEARS, HAS COMPARATIVELY LITTLE EFFECT ON THE PRESENT WORTH.

13. A STUDY OF THE EXISTING TOLL BRIDGES, THEIR COST OF PROMOTING, FINANCING, CONSTRUCTION AND OPERATION, SHOULD CAUSE PUBLIC OFFICIALS HAVING POWER TO GRANT FRANCHISES TO CAREFULLY ANALYZE AND STUDY THE ECONOMIC QUESTIONS INVOLVED BEFORE GRANTING FURTHER FRANCHISES.

14. A GENERAL CONCLUSION IS DRAWN THAT, DUE TO THE EXCEEDING DIFFICULTY IN FIXING A JUST VALUE TO BOTH THE PUBLIC AND PRIVATE INTERESTS CONCERNED, AND DUE TO THE INTRICATE LEGAL PHASES INVOLVED, THE ONLY WAY FOR THE STATE TO ACQUIRE THE OWNERSHIP OF EXISTING TOLL BRIDGES, IF SAME IS DESIRED, IS BY CONDEMNATION.

15. A GENERAL CONCLUSION IS DRAWN THAT, DUE TO THE GENERALLY HIGH COST OF PUBLIC SERVICE OF PRIVATELY OWNED TOLL BRIDGES, AND THE EXTREME DIFFICULTY OF ACQUIRING THEM AFTER THEY ARE CONSTRUCTED, AT A VALUE CONSISTENT WITH THAT FOR WHICH THE STATE OR COUNTY COULD BUILD AND OPERATE THEM, NECESSARY STEPS SHOULD BE TAKEN TO PERMIT THE STATE OR COUNTIES TO FINANCE AND BUILD TOLL BRIDGES ON AN INCOME BOND BASIS; THAT THE FURTHER CONSTRUCTION OF PRIVATELY OWNED TOLL BRIDGES SHOULD BE PROHIBITED.

United States Department of Agriculture
Bureau of Public Roads

CURRENT CONDITION OF FEDERAL AID ROAD WORK

As Of January 31, 1929.

State	Balance of Federal Aid Available For New Projects	P. S. & E. Recommended for Approval						Project Agreements Executed									Paid to States During Fiscal Year	State
		Not Yet Under Construction			Under Construction			Not Yet Under Construction			Under Construction			Final Inspection Made				
		Federal Aid Allotted	Mileage Initial	Mileage Stage	Federal Aid Allotted	Mileage Initial	Mileage Stage	Federal Aid Allotted	Mileage Initial	Mileage Stage	Federal Aid Allotted	Mileage Initial	Mileage Stage	Federal Aid Allotted	Mileage Initial	Mileage Stage		
Alabama	2,519,324.79	246,439.75	13.2	21.0	221,626.25	16.7					1,519,227.38	249.1	12.3	1,899,847.36	176.4	31.2	1,335,869.57	Alabama
Arizona	3,710,470.71	6,631.39		.2							1,269,926.61	70.9	12.3	434,873.36	47.1	1.7	1,019,736.32	Arizona
Arkansas	3,051,061.11				37,238.83	11.0					1,491,536.60	81.4	6.6	896,071.94	114.2		445,642.14	Arkansas
California	2,954,588.64	539,843.12	43.1	5.7	502,755.34	24.7		33,981.06	1.4		4,198,201.87	236.8	.6	1,048,587.04	48.5	8.7	1,468,489.04	California
Colorado	2,943,858.05	231,279.07	20.9		306,996.68	26.7	0.6	20,057.34	2.9		1,596,926.11	135.1	15.3	604,951.85	20.2	16.7	1,418,205.35	Colorado
Connecticut	837,708.90	239,363.73	.9					39,975.00	2.7		419,866.53	21.7		361,721.57	9.6		1,002,184.87	Connecticut
Delaware	306,511.22	154,379.50	7.7		59,411.50						196,095.80	15.7		44,654.03		3.9	97,531.20	Delaware
Florida	2,078,896.61										1,232,677.16	110.7	5.4	158,226.95	.1		652,072.00	Florida
Georgia	2,006,605.00	4,943.09	.4					119,059.13	13.0	4.6	2,294,776.67	228.4	46.6	376,141.87	45.3	10.0	1,220,281.46	Georgia
Idaho	1,001,180.03	29,815.95	3.7		33,534.06	.1	7.8				1,074,606.61	128.6	3.0	485,800.36	42.0	42.7	1,095,722.99	Idaho
Illinois	2,961,155.40	558,362.00	39.6		368,589.79	20.2		169,667.00	7.8		8,695,572.08	603.3		2,205,756.20	148.0		2,929,896.45	Illinois
Indiana	1,479,008.22	726,394.74	53.1					219,778.65	14.8		2,696,132.46	169.2	3.5	2,150,865.61	144.4		2,292,345.45	Indiana
Iowa	2,075,430.98	150,000.00	10.9					79,607.06	3.7	13.6	1,032,469.49	44.4	90.8	1,646,255.43	39.2	87.3	1,132,732.03	Iowa
Kansas	2,154,088.64	20,000.00	3.8		68,656.53	12.5		99,952.04	17.9		2,457,982.60	372.3	11.2	1,287,607.43	154.5	11.3	1,388,588.17	Kansas
Kentucky	1,103,569.62	513,889.97	76.6		310,976.96	41.6		32,333.83	6.3		1,740,854.63	169.9		1,334,573.02	126.7		900,944.81	Kentucky
Louisiana	1,209,402.36	25,000.00	.1		357,357.86						1,976,586.85	193.1		157,077.57	13.0		552,007.52	Louisiana
Maine	1,439,377.47				19,161.14	2.2		93,601.66	8.9		577,297.43	38.7		683,200.43	51.6		61,276.78	Maine
Maryland	664,211.23										194,190.00	13.7		504,760.00	49.3		346,859.75	Maryland
Massachusetts	2,249,237.73	185,475.00	12.4		98,035.70	6.5		26,280.00	1.8		891,037.00	51.6		1,240,997.91	78.0		447,873.90	Massachusetts
Michigan	2,186,595.70	331,041.86	14.5	6.5	297,190.00	17.4					4,426,656.96	254.9		1,629,196.90	96.7		3,002,801.29	Michigan
Minnesota	2,147,297.96										350,618.27	96.1	11.2				2,194,328.05	Minnesota
Mississippi	1,422,774.43	137,590.43	24.9		368,094.01	18.1	.8				2,094,703.13	216.2	40.7	144,195.73	7.9		983,162.17	Mississippi
Missouri	1,815,040.51	462,457.48	32.0	6.9	794,342.16	.3	24.3	79,274.17	9.6	1.1	1,946,067.21	160.4	23.9	1,156,774.20	67.5	33.9	1,624,688.29	Missouri
Montana	4,968,515.52	545,903.64	.4					376,464.83	79.6	.2	1,829,328.06	225.1	13.4	1,549,536.68	204.9	1.3	1,298,336.24	Montana
Nebraska	3,323,914.75	215,831.93	13.5	26.5	120,191.81	12.3	5.8	28,203.07	3.0	11.4	1,434,425.14	293.1	100.2	1,034,478.62	198.7	5.8	937,206.84	Nebraska
Nevada	1,032,584.65	14,846.37		7.5	69,651.11	8.5		80,856.49	14.6		980,247.02	129.8	71.0	697,418.07	77.2	68.6	602,566.39	Nevada
New Hampshire	403,144.24										108,613.31	7.6		251,874.54	17.7		264,226.60	New Hampshire
New Jersey	892,185.94	63,565.00	3.6								863,760.00	57.6		260,622.35	17.7		389,554.23	New Jersey
New Mexico	1,215,283.42	82,104.18	4.0		296,312.73	21.5		47,100.64	10.1		1,857,877.29	187.9	6.1	261,235.17	9.7	.5	1,423,377.81	New Mexico
New York	6,846,530.12	136,650.00	9.1					367,905.00	24.6		5,143,000.65	342.7		3,964,615.34	240.3	8.6	2,676,806.19	New York
North Carolina	1,879,955.70	260,872.53	14.4	7.1	73,269.39						805,215.64	73.0	11.2	685,029.49	63.8	16.8	872,549.21	North Carolina
North Dakota	1,205,164.90	79,750.52	70.3	13.3	6,024.15		.3	227,766.22	105.9	87.9	1,167,780.28	395.7	105.7	1,119,399.99	372.9	214.4	872,861.47	North Dakota
Ohio	3,655,609.62	965,419.81	44.2	9.8	256,180.73	14.5		24,265.19	.4		3,572,822.42	222.6	.1	2,649,224.01	163.1	12.0	2,854,685.07	Ohio
Oklahoma	1,260,218.93	513,908.12	47.5	7.0	1,106,100.23	68.8	37.8				555,632.75	52.4		1,648,745.08	192.5	7.7	1,073,210.15	Oklahoma
Oregon	2,344,038.92										389,806.71	32.1		635,568.15	27.9		362,989.15	Oregon
Pennsylvania	3,633,166.51	106,444.50	7.1					461,479.38	28.1		3,120,917.63	188.6		3,100,547.75	190.9	14.1	3,298,894.11	Pennsylvania
Rhode Island	776,149.23							108,825.00	7.2		89,340.00	6.0		104,694.55	6.6		402,771.00	Rhode Island
South Carolina	1,077,107.20				51,000.00	1.4					1,438,452.17	159.1	88.1	953,856.11	99.2	67.4	644,168.41	South Carolina
South Dakota	1,168,118.57	83,865.18	29.1		125,651.20	19.5	.1	25,143.95	9.9	3.0	1,316,232.16	402.7	39.3	836,355.23	275.0	56.0	920,645.22	South Dakota
Tennessee	1,912,629.21	360,345.49	4.1	28.7	985,534.41	46.5	44.0	96,690.77		9.4	934,663.69	67.9	16.6	1,956,041.50	108.1	43.7	375,008.23	Tennessee
Texas	4,505,811.58	2,079,751.31	193.2	84.7	869,467.02		33.1	265,643.09	17.6	19.9	4,237,108.19	445.1	162.4	2,777,922.82	230.1	97.0	2,120,055.40	Texas
Utah	845,955.01				148,028.11	3.6					885,703.42	67.9		611,328.83	62.1	22.8	724,040.64	Utah
Vermont	409,935.95										288,777.16	20.5		274,832.84	16.9		301,250.03	Vermont
Virginia	1,450,366.97							8,390.23	.2		1,106,633.59	68.9	15.2	734,329.57	52.3	6.4	855,701.66	Virginia
Washington	1,421,537.83	116,100.00	14.6		49,000.00	6.5					1,253,776.25	69.3	18.1	215,600.00	23.2		1,253,500.29	Washington
West Virginia	1,058,298.21				115,590.99	6.7		145,997.43	11.2		422,540.66	33.2	12.4	313,855.19	20.7		890,405.30	West Virginia
Wisconsin	3,188,835.14	26,690.00	5.8		102,580.00	3.3	.1				1,706,763.96	121.1	4.8	1,839,765.81	102.8	37.4	1,285,957.52	Wisconsin
Wyoming	1,009,500.91				70,756.74	9.4					525,464.42	91.5		331,065.66	65.6	.4	1,041,601.11	Wyoming
Hawaii	1,432,123.59										57,501.20	1.8					77,921.87	Hawaii
TOTALS	97,266,088.64	10,204,966.66	817.6	224.9	8,289,283.32	419.6	154.6	3,258,268.12	402.0	151.0	80,565,091.80	7,415.0	947.0	49,080,079.01	4,318.0	928.3	55,344,528.54	TOTALS

CHART FOR PROPORTIONING CONCRETE MATERIALS BY WEIGHT

CONTRIBUTED BY A. F. HAELIG OF DISTRICT 7

THE PURPOSE OF THIS CHART IS TO ENABLE THE PROPORTIONING PLANT INSPECTOR, OF THE AVERAGE ROAD PROJECT, TO BATCH CONCRETE MATERIALS BY WEIGHT WITH THE MINIMUM AMOUNT OF TIME AND EFFORT.

THE CHART IS BASED ON ARBITRARY PROPORTIONS, APPROXIMATELY THE USUAL 1:2:3½-MIX BY VOLUME, WITH THE SAND CONTENT VARIED TO GIVE A CEMENT FACTOR OF 1.50 BARRELS PER CUBIC YARD OF CONCRETE. THIS MIX HAS BEEN EXTENSIVELY USED WITH VOLUMETRIC PROPORTIONING AND WILL, NO DOUBT, PROVIDE WORKABLE HIGH-STRENGTH CONCRETE WHEN BATCHED BY WEIGHT.

THE SPECIFIC GRAVITY OF COARSE AGGREGATE MAY BE DETERMINED IN THE FIELD OR LABORATORY. USUALLY, IT IS KNOWN FOR MATERIALS COMING FROM REGULAR SOURCES OF SUPPLY. IN THIS CASE THE PLANT INSPECTOR NEEDS ONLY TO OBTAIN THE AVERAGE WEIGHT PER CUBIC FOOT OF THE DRY, LOOSE COARSE AGGREGATE AND READ THE WEIGHTS PER BAG OF CEMENT FROM THE ATTACHED CHART.

LET US ASSUME THAT THE COARSE AGGREGATE IS A GRAVEL HAVING A SPECIFIC GRAVITY OF 2.65 AND THAT THE AVERAGE WEIGHT OBTAINED BY THE INSPECTOR IS 100 POUNDS PER CUBIC FOOT. NOW PLACE A STRAIGHTEDGE ACROSS THE CHART FROM THE 100-POUND PER CUBIC FOOT POINT ON LINE A TO THE SPECIFIC GRAVITY OF THE COARSE AGGREGATE OF 2.65 ON LINE B. THE WEIGHT OF COARSE AGGREGATE TO BE USED PER BAG OF CEMENT IS TAKEN DIRECTLY FROM THE RIGHT SIDE OF LINE A AND IS 350 POUNDS. THE WEIGHT OF DRY SAND TO BE USED PER BAG OF CEMENT IS TAKEN FROM LINE X AND IS 194 POUNDS.

WHEN THE SPECIFIC GRAVITY OF THE SAND HAS BEEN DETERMINED AND VARIES FROM THE AVERAGE OF 2.68, A CORRECTION CAN EASILY BE MADE. IF THE SPECIFIC GRAVITY OF THE SAND IS 2.66, THE READING TAKEN FROM LINE X SHOULD BE DECREASED 1½ POUNDS, AND IF THE SPECIFIC GRAVITY OF THE SAND IS 2.70, THE READING SHOULD BE INCREASED 1½ POUNDS. FOR MOST SANDS, THE CHART WILL GIVE ACCURATE DRY WEIGHTS WITHOUT THIS CORRECTION.

THE CHART IS BASED ON AN AVERAGE WATER CONTENT OF 5½ GALLONS PER BAG OF CEMENT BUT WILL BE APPROXIMATELY CORRECT FOR ALL WATER RATIOS GREATER THAN FIVE AND LESS THAN SIX GALLONS PER SACK.

WHEN AVERAGE MATERIALS ARE USED THE BATCH WEIGHTS OBTAINED FROM THIS CHART CHECK CLOSELY WITH THOSE OBTAINED WHEN THE MIX IS DESIGNED BY THE MORTAR-VOID METHOD USING A VALUE OF $\frac{B}{B_0} = 0.775$. (UNIVERSITY OF ILLINOIS BULLETIN NO. 137).

CHART FOR PROPORTIONING CONCRETE BY WEIGHT

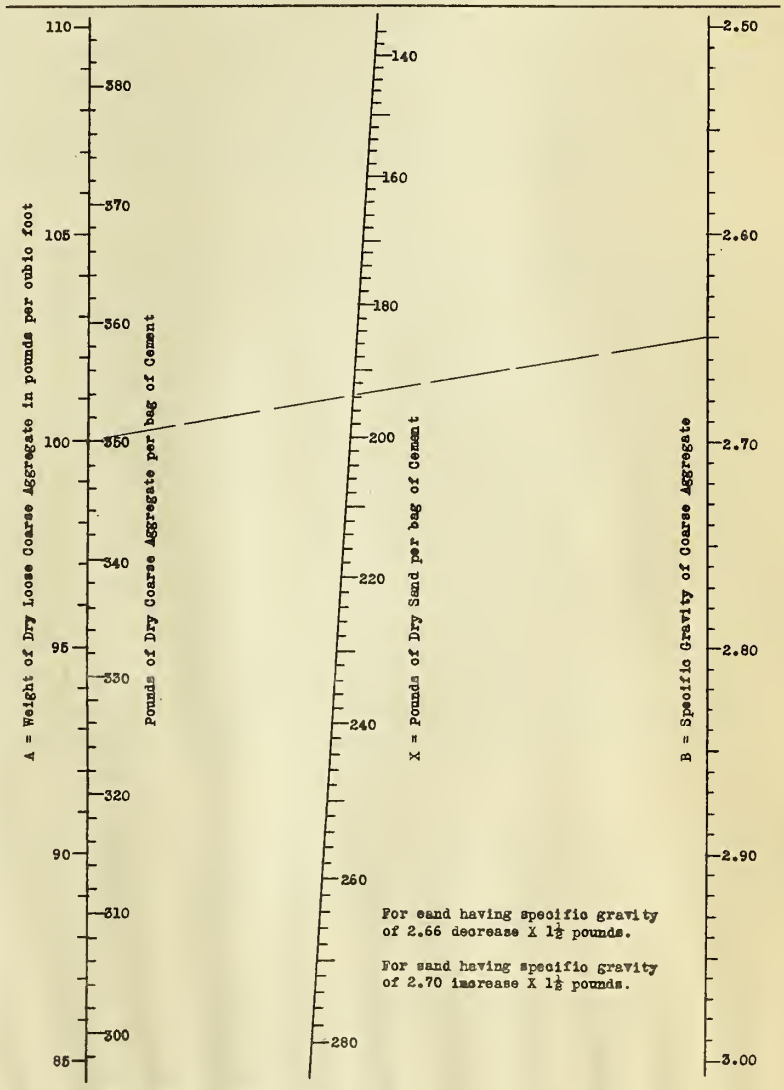
Based on

3½ cubic feet of Coarse Aggregate per bag of Cement
1.50 barrels of Cement per cubic yard of Concrete

and

5½ gallons of Water per bag of Cement

Specific Gravity of Sand = 2.68



TREND OF CONCRETE PAVEMENT DESIGN - JANUARY 1, 1929

CONTRIBUTED BY THE DIVISION OF DESIGN
(NOT FOR RELEASE)

THE TREND OF CONCRETE PAVEMENT DESIGN, AS INDICATED BY THE PLANS SUBMITTED FOR FEDERAL-AID PROJECTS, HAS CHANGED TO SOME EXTENT SINCE THE ISSUE OF THE TABLE, IN THE NEWS LETTER OF FEBRUARY, 1928, SHOWING THE NUMBER OF PROJECTS SUBMITTED, DURING 1927, OF THE UNIFORM-THICKNESS, THIN-EDGE, AND THICKENED-EDGE CROSS-SECTION. THE PRINCIPAL CHANGE IN THE DATA IS WITH REGARD TO THE THIN-EDGE SECTION WHICH HAS NOW BEEN ABANDONED BY EVERY STATE. FOR THE FIRST TIME SINCE THIS INFORMATION HAS BEEN PUBLISHED THERE IS SHOWN THE MILEAGE AS WELL AS THE NUMBER OF PROJECTS ON WHICH THE VARIOUS CROSS SECTIONS WERE USED. THE TOTAL MILEAGE OF THE UNIFORM-THICKNESS DESIGN BUILT IN 1928 ON FEDERAL-AID PROJECTS WAS 319 MILES AND OF THE THICKENED-EDGE CROSS SECTION THE TOTAL WAS 2,899 MILES.

AS MAY BE SEEN FROM THE ACCOMPANYING TABLE THE THICKENED-EDGE TYPE PREVAILS, WITH 87 PER CENT OF THE TOTAL NUMBER OF PROJECTS AND 90 PER CENT OF THE TOTAL MILEAGE AS COMPARED WITH 13 AND 10 PER CENT, RESPECTIVELY, FOR THE UNIFORM-THICKNESS CROSS-SECTION. OF THE MILEAGE OF UNIFORM-THICKNESS DESIGNS USED IN 1928, 33 PER CENT WERE OF THE 6-6-6 CROSS-SECTION; 31 PER CENT OF THE 8-8-8; 19 PER CENT OF THE 7-7-7; AND 16 PER CENT OF THE 9-INCH THICKNESS. FOR THE THICKENED-EDGE TYPE THE 9-6-9 AND 9-6½-9 CROSS SECTIONS PREDOMINATED IN 1928, THEIR COMBINED MILEAGE BEING 39 PER CENT OF THE TOTAL; THEN CAME THE 9-7-9 WITH 38 PER CENT; NEXT THE 8-6-8 WITH 8 PER CENT; FOLLOWED BY THE 10-7-10 WITH 6 PER CENT, AND THE LAST MILEAGE OF CONSEQUENCE CONSISTED OF THE 8-7-8 CROSS SECTION WITH 4½ PER CENT. THE UNIFORM-THICKNESS DESIGNS WERE MOSTLY SUBMITTED FROM THE NORTHERN STATES WHERE STEEL REINFORCEMENT IS USED AND ALSO WHERE THERE HAS BEEN EMPLOYED SOME FORM OF TREATMENT TO INCREASE THE STABILITY OF THE SUBGRADE.

IN 16 STATES THE THICKENING IS ACCOMPLISHED IN THE OUTER 2 FEET, IN 7 STATES IN THE OUTER 3 FEET, IN 6 STATES IN 4 FEET FROM THE EDGE, AND IN 9 STATES THE THICKENING IS OBTAINED BY MEANS OF A CROWNED SUBGRADE.

THIRTY STATES UTILIZE EXPANSION JOINTS SPACED FROM 25 TO 201 FEET APART, WHILE 12 STATES OMIT EXPANSION JOINTS ENTIRELY. OF THE STATES USING EXPANSION JOINTS, 15 PLACE DOWELS ACROSS THE JOINT AND 15 USE NO DOWELS WHATEVER. THE LONGITUDINAL EXPANSION JOINT IS NOW PRACTICALLY STANDARD CONSTRUCTION ALTHOUGH

THERE ARE STILL 4 STATES THAT HAVE NOT ADOPTED IT AND 7 OF THE STATES USING THE LONGITUDINAL JOINT OMIT THE DOWELS. FOURTEEN STATES USE NO STEEL REINFORCEMENT AND 7 STATES EMPLOY EDGE BARS ONLY. SEVEN STATES CONSTRUCT ONLY REINFORCED PAVEMENTS, AND 16 STATES BUILD BOTH THE PLAIN AND REINFORCED CONCRETE SURFACES.

THE TREND OF DESIGN OF FEDERAL-AID CONCRETE-PAVEMENT PROJECTS, AS OF JANUARY 1, 1929

(UNIFORM-THICKNESS PROJECTS)

Design thickness: Edge	Center	Edge	Number of Federal-aid projects submitted by years: 1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	Miles: 1928	Total number
In.	In.	In.														
5	5	5	-	1	-	1	2	1	-	-	-	-	-	-	-	5
6	6	6	2	3	3	24	24	49	10	4	3	3	8	12	106.7	145
7	7	7	1	11	17	31	22	80	70	33	47	27	37	17	61.1	393
7½	7½	7½	2	4	17	31	21	30	9	1	-	2	-	-	-	117
8	8	8	4	17	68	90	78	85	51	51	44	57	53	29	98.8	637
9	9	9	-	1	13	9	9	8	8	-	-	7	1	18	52.0	74
10	10	10	-	-	5	5	5	2	2	-	1	2	-	1	0.2	23
12	12	12	-	-	-	-	-	-	2	-	1	-	-	-	-	3
Total uniform-thickness projects			9	37	123	191	161	255	162	89	96	98	99	77	318.8	1,397

(THIN-EDGE PROJECTS)

5	6	5	-	-	1	11	3	1	-	-	-	-	-	-	-	16
5	7	5	4	10	7	4	-	3	-	-	-	1	-	-	-	29
6	7	6	-	1	9	17	8	39	25	-	-	-	-	-	-	99
6	8	6	4	13	92	60	56	71	16	25	9	11	10	-	-	367
7	8	7	1	11	65	55	23	24	18	-	-	-	-	-	-	197
7	9	7	-	-	1	2	-	2	4	-	-	-	-	-	-	9
8	10	8	-	-	-	-	-	1	1	-	-	-	-	-	-	2
Total thin-edge projects			9	35	175	149	90	141	64	25	9	12	10	-	-	719

THE TREND OF DESIGN OF FEDERAL-AID CONCRETE-PAVEMENT PROJECTS, AS OF JANUARY 1, 1929. (CONTINUED)

(THICKENED-EDGE PROJECTS)

Design thickness: Edge (In.)	Design thickness: Center (In.)	Design thickness: Edge (In.)	Number of Federal-aid projects submitted by years: 1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	Miles 1929	Total number
7	5	7	-	-	-	-	-	1	-	-	-	-	-	-	-	1
7	6	7	-	-	-	-	-	1	23	38	43	24	5	2	9.2	136
7½	5½	7½	-	-	-	-	-	-	-	-	15	2	-	-	-	17
7½	6	7½	-	-	-	-	-	-	-	12	-	6	19	11	49.0	48
8	5	8	-	-	-	-	-	-	-	4	-	-	-	-	-	4
8	6	8	-	-	-	-	1	8	17	21	72	52	34	30	222.5	235
8	6½	8	-	-	-	-	-	-	-	-	4	4	10	5	17.6	23
8	7	8	-	-	-	-	-	-	3	25	33	33	21	26	131.8	141
8½	6½	8½	-	-	-	-	-	-	-	-	-	-	1	-	-	1
8½	7	8½	-	-	-	-	-	-	-	-	-	-	1	1	8.1	2
9	5	9	-	-	-	-	-	-	-	2	1	1	2	4	23.3	10
9	6	9	-	-	-	-	3	-	55	180	160	192	197	174	[illegible]	961
9	6½	9	-	-	-	-	-	-	-	22	34	34	15	52	1,119.3	157
9	7	9	-	-	-	-	-	9	6	38	49	80	98	188	1,115.3	468
9	8	9	-	-	-	-	-	-	-	-	-	-	-	1	2.6	1
10	7	10	-	-	-	-	-	2	1	5	3	26	25	21	177.5	83
10	8	10	-	-	-	-	-	1	3	9	3	4	5	5	21.6	30
11	9	11	-	-	-	-	-	-	-	-	-	-	-	1	0.7	1
12	6	12	-	-	-	-	-	-	-	-	1	-	-	-	-	1
Total thickened-edge projects			-	-	-	-	4	22	108	356	418	458	433	521	2,899.0	2,320
Grand totals			18[illegible]	72	298	340	255	418	334	470	523	568	542	598	3,217.8	4,436

PROGRESS OF FEDERAL HIGHWAY LEGISLATION INTRODUCED IN THE SECOND SESSION OF THE SEVENTY-FIRST CONGRESS BEGINNING DECEMBER 3, 1928

(NOT FOR RELEASE)

THE FOLLOWING DIGEST SHOWS THE BILLS INTRODUCED SINCE THE PREVIOUS ISSUE OF THE NEWS LETTER. NO FURTHER ACTION HAS BEEN TAKEN ON THE BILLS BRIEFED IN THE PRECEDING NEWS LETTER.

S. 5535.- INTRODUCED IN THE SENATE ON JANUARY 24, 1929, BY C. S. DENEEN OF ILLINOIS AND REFERRED TO THE COMMITTEE ON ROADS. PROVIDES FOR THE ESTABLISHMENT OF THE LINCOLN MEMORIAL HIGHWAY COMMISSION TO MAKE A SURVEY AND RECOMMENDATION WITH REGARD TO THE CONSTRUCTION OF A HIGHWAY BETWEEN THE CITIES OF CHARLESTON AND FARMINGTON, ILL., AND PASSING THROUGH SHILOH CEMETERY AND OTHER PLACES IN COLES COUNTY, ILL., HISTORICALLY CONNECTED WITH THE LIFE OF ABRAHAM LINCOLN PRIOR TO HIS ASSUMING THE DUTIES OF THE PRESIDENCY. THIS BILL IS IDENTICAL TO H.R. 16308 DESCRIBED IN THE PRECEDING ISSUE OF THE NEWS LETTER.

S. 5808.- INTRODUCED IN THE SENATE ON FEBRUARY 15, 1929, BY T. L. ODDIE OF NEVADA AND REFERRED TO THE COMMITTEE ON POST OFFICES AND POST ROADS. PROVIDES FOR THE AMENDMENT OF EXISTING FEDERAL-AID ROAD LEGISLATION BY AUTHORIZING AN APPROPRIATION OF $3,500,000 FOR EACH OF THE FISCAL YEARS 1929, 1930, AND 1931, FOR THE CONSTRUCTION AND MAINTENANCE OF THE MAIN ROADS THROUGH UNAPPROPRIATED OR UNRESERVED PUBLIC LANDS, NON-TAXABLE INDIAN LANDS, OR OTHER FEDERAL RESERVATIONS. THE SUMS FOR THE THREE YEARS ARE AUTHORIZED TO BE ALLOCATED AMONG THE STATES, HAVING MORE THAN 5 PER CENTUM OF THEIR AREA IN PUBLIC LANDS, IN PROPORTION TO THE AREA OF THE PUBLIC LAND IN EACH STATE AS COMPARED WITH THE TOTAL PUBLIC LAND IN ALL THE STATES. THIS BILL IS IDENTICAL WITH H.R. 14665, WHICH WAS DESCRIBED IN THE PRECEDING ISSUE OF THE NEWS LETTER.

H.R. 16773.- INTRODUCED IN THE HOUSE ON JANUARY 31, 1929, BY B. E. KEMP OF LOUISIANA AND REFERRED TO THE COMMITTEE ON ROADS. AUTHORIZES AN APPROPRIATION OF $3,654,000 FOR THE RELIEF OF THE STATES OF MISSOURI, MISSISSIPPI, LOUISIANA, AND ARKANSAS IN THE MATTER OF ROADS AND BRIDGES DAMAGED OR DESTROYED BY THE FLOODS OF 1927. THIS BILL IS IDENTICAL WITH S. 5201, AS DESCRIBED IN THE PRECEDING NEWS LETTER.

BUREAU TO COOPERATE WITH ASPHALT INDUSTRY IN STUDIES OF LOW-COST BITUMINOUS-TREATED ROADS

AT THE SUGGESTION OF THE CHIEF OF BUREAU ARRANGEMENTS ARE BEING MADE FOR COOPERATION WITH THE ASPHALT INDUSTRY IN EXTENSIVE STUDIES AND EXPERIMENTS WITH THE OBJECT OF DEVELOPING USES OF BITUMINOUS MATERIALS IN THE IMPROVEMENT OF SECONDARY AND TERTIARY ROADS AND THE DEVELOPMENT OF BITUMINOUS PRODUCTS SUITABLE FOR SUCH USE.

FOLLOWING A CONFERENCE WITH EXECUTIVES OF THE INDUSTRY WHICH WAS HELD AT THE WASHINGTON OFFICE OF THE BUREAU ON JANUARY 30, ARRANGEMENTS WERE MADE FOR THE APPOINTMENT OF A JOINT TECHNICAL COMMITTEE TO PLAN THE DETAILS OF THE INVESTIGATIONS.

THE FIRST MEETING OF THE LATTER COMMITTEE WAS HELD AT WASHINGTON ON MARCH 7, AND TENTATIVE PLANS WERE MADE FOR COOPERATIVE INVESTIGATIONS ALONG TWO PRINCIPAL LINES.

THE FIRST EFFORT WILL BE DIRECTED TOWARD A STUDY OF CURRENT PRACTICE IN ORDER TO APPRAISE THE RELATIVE WORTH AND APPLICABILITY OF METHODS DEVELOPED TO DATE, AND TO DETERMINE IF POSSIBLE WHAT CHARACTERISTICS OF THE BITUMINOUS MATERIALS AND ROAD SURFACING MATERIALS OF VARIOUS KINDS HAVE CONTRIBUTED TO THE SUCCESSFUL RESULTS THAT HAVE BEEN OBTAINED.

IN THIS PHASE OF THE INVESTIGATION, WHICH WILL BE CONDUCTED WITH THE LEAST POSSIBLE DELAY, DETAILED STUDIES WILL BE MADE OF SELECTED SECTIONS OF ROAD ALREADY CONSTRUCTED IN ALL PARTS OF THE COUNTRY. THESE WILL INCLUDE, IN ADDITION TO STUDIES OF THE CHARACTERISTICS OF THE BITUMINOUS AND ROAD SURFACING MATERIALS, THE ACQUISITION OF DETAILED DATA IN REGARD TO THE METHODS OF CONSTRUCTION AND MAINTENANCE EMPLOYED, THE TRAFFIC TO WHICH THE SECTIONS HAVE BEEN SUBJECTED, THE COSTS OF CONSTRUCTION AND MAINTENANCE, THE CHARACTER OF THE SUBGRADE AND DRAINAGE IN EACH CASE, AND THE EFFECTS OF CLIMATE ON THE VARIOUS TYPES OF CONSTRUCTION.

THE PURPOSE OF THIS PART OF THE INVESTIGATION IS TO DETERMINE WHICH OF THE VARIOUS METHODS AND TYPES OF MATERIAL THUS FAR DEVELOPED OFFER THE GREATEST PROSPECT OF FUTURE DEVELOPMENT TO MEET THE VARYING CONDITIONS OF SEVERAL PARTS OF THE UNITED STATES.

INFORMATION OF VALUE PRODUCED FROM THE STUDY WILL BE RELEASED IN THE FORM OF PROGRESS REPORTS AS RAPIDLY AS POSSIBLE.

THE STUDIES OF CURRENT PRACTICE WILL BE FOLLOWED, ACCORDING TO PRESENT PLANS, BY MORE INTENSIVE RESEARCH, INVOLVING LABORATORY AND PLANT ANALYSES OF ALL COMMERCIAL BITUMINOUS PRODUCTS AND THE AVAILABLE DISTILLATES AND RESIDUALS, AND THE CONSTRUCTION OF EXPERIMENTAL ROADS WITH A VIEW TO DISCOVERING WHAT IMPROVEMENTS MAY BE MADE IN THE DESIGNS, METHODS, AND MATERIALS THUS FAR EMPLOYED.

WALTER FREEMAN BROOKS

WALTER FREEMAN BROOKS, SENIOR HIGHWAY ENGINEER OF DISTRICT 7, IN CHARGE OF THE FEDERAL-AID ROAD WORK IN THE STATE OF MICHIGAN SINCE THE PASSAGE OF THE FIRST FEDERAL-AID ROAD ACT IN 1916, DIED AT THE PRESBYTERIAN HOSPITAL IN CHICAGO, ON FEBRUARY 7, 1929. MR. BROOKS HAD BEEN IN FAILING HEALTH FOR SEVERAL YEARS BUT CONTINUED WITH HIS WORK UNTIL JANUARY 3, WHEN HIS CONDITION BECAME CRITICAL. FROM THAT TIME ON HE FAILED RAPIDLY UNTIL THE EARLY MORNING HOURS OF THE SEVENTH OF FEBRUARY. THE FUNERAL SERVICES WERE HELD ON FEBRUARY 9.

MR. BROOKS IS SURVIVED BY HIS WIDOW MARGARET L., AND THREE CHILDREN, CHARLOTTE, FREEMAN, AND KATHERINE BROOKS HENDRON, ALL OF CHICAGO.

MR. BROOKS WAS BORN ON APRIL 17, 1861, AT RUTLAND, MASS. WHEN HE WAS 5 YEARS OF AGE, HIS FAMILY MOVED TO MINNESOTA, NEAR MANKATO. THERE HE RECEIVED HIS SECONDARY EDUCATION IN THE COUNTRY SCHOOLS OF BLUE EARTH COUNTY, MINN., AS PREPARATORY WORK FOR THE STATE NORMAL SCHOOL AT MANKATO, WHICH HE ATTENDED FOR 2 YEARS. WITH THIS PRELIMINARY EDUCATION HE RETURNED TO THE EAST FOR HIS COLLEGIATE WORK, RECEIVING A B. S. DEGREE IN 1886 FROM THE WORCESTER POLYTECHNIC INSTITUTE,

MR. BROOKS' ENGINEERING EXPERIENCE BEGAN WITH THE GREAT NORTHERN RAILWAY, WITH HEADQUARTERS AT ST. PAUL, MINN., WHERE HE WAS ASSISTANT ENGINEER ON CONSTRUCTION AND LOCATION FROM 1886 TO 1889. AT THE CLOSE OF THIS ENGAGEMENT HE MOVED TO THE PACIFIC COAST AND WAS ENGAGED IN THE CONSTRUCTION OF THE OREGON PACIFIC RAILWAY FROM 1889 TO 1890, AS AN ASSISTANT ENGINEER, AFTER WHICH HE OCCUPIED A SIMILAR POSITION ON THE LOCATION OF THE UNION PACIFIC RAILWAY OUT OF PORTLAND, ORE., FROM 1890 TO 1891. THEN MOVING SOUTH INTO MEXICO HE BECAME A DIVISION ENGINEER ON THE LOCATION AND CONSTRUCTION OF THE FERROCARRIL SAN QUENTIN Y YUMA, IN LOWER CALIFORNIA, FROM 1891 TO 1892. RETURNING NORTH, HE BECAME AGAIN AN ASSISTANT ENGINEER ON THE LOCATION AND CONSTRUCTION OF THE GREAT NORTHERN RAILWAY FROM 1893 TO 1896. DURING THE PERIOD IN WHICH HE WAS ENGAGED IN THIS PIONEER RAILROAD WORK, MR. BROOKS EXPERIENCED THE THRILLS AND HARDSHIPS THAT THE ENGINEERS OF THAT TIME KNEW SO WELL.

RETURNING TO MANKATO, MINN., IN 1894, MR. BROOKS ENGAGED IN GENERAL PRACTICE INCLUDING DRAINAGE, HIGHWAYS AND BRIDGES, AND PRELIMINARY SURVEYS FOR THE HYDRO-ELECTRIC POWER DEVELOPMENT

AT RAPIDAN, MINN. HE ALSO ACTED AS COUNTY ENGINEER FOR MANY YEARS AND HAD CHARGE OF ROAD AND BRIDGE SURVEYS AND CONSTRUCTION, CONTINUING IN WORK OF THAT CHARACTER UNTIL MAY 1, 1914 WHEN HE ACCEPTED THE POSITION OF SENIOR HIGHWAY ENGINEER IN THE BUREAU.

HIS FIRST ASSIGNMENTS WITH THE BUREAU WERE ON ROAD CONSTRUCTION AND INSPECTIONS IN THE EASTERN AND SOUTHERN SECTIONS OF THE COUNTRY. HE ALSO RENDERED VALUABLE ASSISTANCE IN THE ORGANIZATION OF THE KENTUCKY STATE HIGHWAY DEPARTMENT. AT THE OUTBREAK OF THE WORLD WAR, MR. BROOKS WAS CHOSEN TO SUPERVISE ROAD CONSTRUCTION IN CAMP TAYLOR AT LOUISVILLE, KY. WHEN THIS WORK WAS COMPLETED HE WAS ASSIGNED TO DISTRICT NO. 7, WITH HEADQUARTERS AT CHICAGO, AND PLACED IN GENERAL CHARGE OF THE FEDERAL-AID ROAD WORK IN MICHIGAN. THIS POSITION HE HELD UNTIL HIS DEATH, COOPERATING SPLENDIDLY WITH THE STATE HIGHWAY OFFICIALS AND RENDERING SIGNAL SERVICE TO THE STATE AND THE NATION.

MR. BROOKS WAS A MEMBER OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS, A PAST PRESIDENT OF THE MINNESOTA SOCIETY OF SURVEYORS AND ENGINEERS, A MEMBER OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, AND OF THE SOCIAL SCIENCE CLUB OF MANKATO, MINN. FROM THE AGE OF 21 YEARS, HE WAS A MEMBER OF THE MASONIC ORDER.